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**COMMUNICATION SYSTEM FOR REBROADCASTING ELECTRONIC
CONTENT WITHIN LOCAL AREA NETWORK**

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Related Applications

[0001] The present application is a continuation-in-part of Serial Number 09/564,082 (PD-200027) filed on May 3, 2000. The present application claims priority to provisional applications each of which are incorporated by reference herein as follows: Serial Nos. 60/249,153 (PD-200352) filed on November 16, 2000, entitled "Mobile Multimedia Subscription Programming Delivery System"; Serial No. 60/262,811 (PD-201008) filed on January 19, 2001, entitled "A New Method For Delivering In-Vehicle Entertainment Services"; Serial No. 60/268,482 (PD-201027) filed on February 12, 2001, entitled "Portable Handheld Devices To Receive Digital Over The Air Broadcasts"; Serial No. 60/271,578 (PD-201029) filed on February 22, 2001, entitled "A New Method And System For Delivering Mobile Direct To Home Entertainment Services", and Serial No. 60/272,741 (PD-201030) filed on March 1, 2001 entitled "A New Method And System For Delivering Entertainment To Portable Devices". The present application is also related to US patent application entitled; "Digital Over-The-Air Communication System For Use With Analog Terrestrial Broadcasting System" (Attorney Docket Number PD-200352A); "Digital Over-The-Air Communication System For Use With Digital Terrestrial Broadcasting System" (Attorney Docket Number PD-201008A); "Portable Device For Use With Digital Over-The-Air Communication System For Use With Terrestrial Broadcasting System" (Attorney Docket Number PD-201027A); "Communication System With Secondary Channel Rebroadcasting Within A Local Area Network" (Attorney Docket Number PD-201029A) filed simultaneously herewith and incorporated by reference herein.

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[0002] The present invention relates generally to broadcasting digital information, and more specifically, to distributing electronic content using a wireless local network.

[0003] Hughes Electronics Corporation provides digital direct broadcast systems such as DIRECTV® and DIRECPC™ that broadcast via satellite, television programs and information or computer applications, respectively. DIRECTV® broadcasts television programming in a similar fashion to that of terrestrial television. DIRECPC™ subscribers place requests that are queued up and broadcast, to the subscriber's computer. DIRECPC™ services on-demand requests. DIRECTV® and DIRECPC™ incorporate encryption in addressing for applications such as on-demand requests. These systems provide access control where users make selection decisions in advance of the content being broadcast. The DIRECTV® system is stationary in that the television is hardwired to the antenna device.

[0004] Mobile devices such as cellular phones and personal digital assistants are increasing their presence in the marketplace. The functionality of such devices is increasing to such applications as the Internet. However, such devices have heretofore been limited to Internet applications.

[0005] Satellite connectivity directly to mobile devices has typically been expensive due to the size and complexity of antennas desired. Therefore, it was previously assumed that no economical method for delivering cable-like channels to mobile devices was practical. Further, such connectivity may be restricted or eliminated entirely within a building.

[0006] It would therefore be desirable to provide cable-like TV channels to mobile devices in a reliable and cost effective manner.

Summary Of The Invention

[0007] It is therefore one object of the present invention to provide a system that enables the portability of electronic content such as cable-like television programming.

[0008] In one aspect of the invention, a system of distributing electronic content has a network operations center generating a broadcast signal having digital electronic content. A communication backbone is coupled to the network operations center. A base station receives the broadcast signal from the backbone. The base station receives the broadcast signal and forms a wireless local area network. The base station rebroadcasts at least a portion of the broadcast signal as a rebroadcast signal using the wireless local network. A user appliance is positioned with said local area network and receives the rebroadcast signal.

In a further aspect of the invention, a method of distributing electronic content comprising the steps of:

broadcasting a television signal as a electronic content;

receiving the electronic content;

digitally compressing the electronic content into a compressed signal;

and

rebroadcasting the compressed signal using a wireless local area network.

[0009] One advantage of the invention is that the system may be used by multiple users within the local area network. Also, the system may also be extended beyond residential use into commercial use such as within commercial buildings and mass transit.

[0010] Other objects and features of the present invention will become apparent when viewed in light of the detailed description of the preferred embodiment when taken in conjunction with the attached drawings and appended claims.

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Brief Description of the Drawings

[0011] Figure 1 is a diagrammatic view of the system architecture of a system according to the present invention.

[0012] Figure 2 is a more detailed block diagrammatic view of the system of Figure 1.

Best Modes For Carrying Out The Invention

[0013] In the following figures the same reference numerals will be used to identify the same components in the various views.

[0014] As described in this application, "electronic content" is meant to encompass various types of digital information including the distribution of music, videos, movies, music videos, games, advertising and promotional materials associated with the content. "Electronic content" may also include cable-type television programming that includes wide variety of multi-channel content.

[0015] Referring now to Figure 1, electronic content distribution system 10 is illustrated. Electronic distribution system 10 generally has a network operations center (NOC) 12, a communication backbone 14 in communication with NOC 12, and a base station 16 that acts as a redistribution device transmits at least a portion of the received electrical content to user appliances or devices 18 over the air.

[0016] The communication backbone 14 is a way or infrastructural device in which to move data to base station 16. Communication backbone 14 may include a high altitude distribution device 14A such as a satellite or stratospheric platform, cable television cable 14B, fiber optics 14C, over the air digital broadcasting or analog broadcasting. Base station 16 is a rebroadcasting device such as a set top box that forms a wireless local area network with the user appliances 18. The set top box may be a version of the integrated receiver decoder currently available for the DIRECTV® system modified to provide wireless redistribution through transmitter 17.

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[0017] The network operations center 12 is coupled to national feeds 20 and national ad sales 22 through content packaging 24. National feeds 20 may, for example, be national "cable" type services channels or satellite service such as DIRECPCTM or DIRECTV[®]. The national ad sales 22 may be derived in-house 28 or as will be further described below may be obtained from various promotional ad agencies. A content packaging block 24 is coupled to national feeds 20 and national ad sales 22. The content packaging 24 functions to couple national feeds 20 with national ad sales 22.

[0018] The network operations center 12 has a control system that includes various computers 32, a data encoder 34, and a multiplexer 36 that are coupled to antennas 38 that uplink electronic content to backbone 14. Of course, antennas 38 may be eliminated if backbone 14 is a cable or optical system. The control system 30 operates in a manner known to those skilled in the art. The network operations center 12 may or may not compress the electronic content before distribution through backbone 14.

[0019] Base station 16 has an antenna 40 that receives signals from backbone 14. Of course, the antenna 40 may be eliminated for another type of connection in fiber or cable backbones. Base station 16 has a control system 42 that comprises a decompression software (when the signals from NOC12 are compressed), conditional access and compression software as will be further described below. Control system 42 redistributes the received electronic content in a compressed format from transmitter 17 through antenna 44 and ultimately to the user appliance 18.

[0020] User appliance 18 is coupled to an antenna 62 used for receiving over-the-air broadcast signals from antenna 44. User appliance 18 may comprise a variety of devices such as a personal computer 64, a laptop computer 66, a network 68 or a hand-held device 70. Each of the devices is preferably coupled to an antenna 62 for receiving over-the-air signals. Each device may have the antenna 62 coupled therein or may be connected to a separate antenna such as that of an automotive vehicle.

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Hand-held device 70 may comprise a variety of devices such as a digital media receiver, a personal digital assistant, or other type of hand-held device. Preferably, each user device 18 has a menu 72 or other selection apparatus such as buttons or switches for selecting electronic content broadcast by base station 16. Menu 72 may provide information to the user as to the current electronic content being broadcast or may provide an interface to the electronic content stored within the user device.

[0021] Referring now to Figure 2, a block diagram of a broadcast system 10 illustrating a more detailed control system 42 is illustrated. Figure 2 uses the same reference numerals for the same components as Figure 1. That is, electronic content 72 such as video programming is provided to a network operation center 12 through the various methods described above. Backbone 14 distributes the electronic content to the base station 16.

[0022] The set top box or base station 16 includes antenna 40 for receiving the electronic content signals described above. A tuner 74 may also be included therein for tuning various channels received through the electronic content signal. Tuner 74 may include various numbers of individual tuners for the use of multiple users. The multiple users may include directly connected users such as a television 78 or mobile user devices 18. Conditional access software 79 may also be provided at redistribution device 40 to allow only authorized users access to the broadcast electronic content signals.

[0023] The received electronic content signal is compressed in compression software 80. Compression software 80 may include various types of digital compression including MPEG 4 compression software. Video display and audio output 82 thus receives the compressed electronic content which is then coupled to a wireless local area network interface 84.

[0024] Wireless local area network interface 84 uses an antenna 62 to redistribute the video display and audio output 82 to the user devices 18 through the

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antenna 86 on user device 16. Wireless local area network interface 84 preferably transmits using standard wireless technology such as Bluetooth or the 802.11 type interface a predetermined distance from base station 16. Preferably, the rebroadcast signal has less digital video content which is more suitable for retransmission to mobile devices. Typically, mobile devices do not include the processing power of high level devices such as set top boxes. Because mobile devices are smaller, the amount of content and thus the corresponding digital bits may be reduced without losing a high quality effect. The base unit 16 may be used to rebroadcast all or a portion of the digital content.

[0025] User device 18 preferably includes a tuner 88 for selecting the desired rebroadcast signal (if more than one is rebroadcast) and digital decompression software 90 that decompresses the rebroadcast signal. Conditional access software 92 may also be provided at user device 16 to allow only authorized users access to the rebroadcast signals. Such software may comprise a number of types of devices or code including password or digital key enablement.

[0026] In operation, the digital electronic content is coupled to the backbone 14. The digital electronic content is received at the base station 16. A compressed signal is formed from the electronic content. The base station 16 forms an over-the-air rebroadcast signal that is rebroadcast to the user devices 18 where it is received, displayed, or heard. Preferably, a base station 16 such as a set top box for the DIRECTV® system is modified to include the wireless local area network system described above. Such a system will provide an additional service for DIRECTV® users who require portability.

[0027] Various uses for such a system will be evident to those skilled in the art. One use envisioned for such a device is for residential use so that the electronic content may be enjoyed by watching television 78 while users throughout the house and nearby surroundings may enjoy the rebroadcast electronic content. Other uses include public buildings and public transportation. A base station 16 may be

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employed on the building or public transportation to receive the electronic content and rebroadcast the electronic content to the mobile wireless devices located within the local area network of the base station 16. Examples of suitable public places include airports, shopping malls, arenas, subways, trains, buses and the like.

[0028] While particular embodiments of the invention have been shown and described, numerous variations alternate embodiments will occur to those skilled in the art. Accordingly, it is intended that the invention be limited only in terms of the appended claims.

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